Interim Report on Bird Inventory and Monitoring at National Park Service Units in the Northern Great Plains, 2002

Photo by Brian Small

By:

Arvind Panjabi
Rocky Mountain Bird Observatory
14500 Lark Bunting Lane
Brighton, CO 80603

Submitted to:

Dan Licht
National Park Service
Mount Rushmore National Memorial
P.O. Box 268, Hwy 244
Keystone SD 57751

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Introduction

National Park Service (NPS) lands (including National Parks, Monuments, Historic Sites, and Memorials) often support high-quality biological communities and therefore may have significant natural resource conservation values. In particular, birds are a natural resource for which many parks are highly valued, even if they were not established, and are not managed, with birds in mind. NPS lands have been, and continue to be, subject to a variety of internal and external pressures that may affect the integrity of the avifauna within a park. These pressures may include historical and/or current land use within the park, public visitation/recreation, management emphasis of other resources, and changes in the surrounding landscape.

Inventory and long-term monitoring of bird species provides information critical to understanding the status of bird populations, enabling their effective management and conservation. In 2002, Rocky Mountain Bird Observatory (RMBO) began implementing bird inventories and monitoring in seven NPS units ("parks") as part of a 3-year cooperative effort with the NPS Northern Great Plains Inventory and Monitoring (I&M) Program. The parks, located in Wyoming, South Dakota, and North Dakota, include Devil's Tower National Monument, Jewel Cave National Monument, Wind Cave National Park, Mount Rushmore National Memorial, Fort Laramie National Historic Site, Fort Union Trading Post National Historic Site, and Knife River Indian Villages National Historic Site.

The primary goal of the bird inventories is to document the presence of bird species not yet documented at the parks so that at least 90% of the expected breeding species at a park will have been documented by the end of the inventory effort. The inventories will also provide an update on the status of previously documented species in each park. *Documented* and *expected* species in each park were classified by the Northern Great Plains I&M Program. Because some bird species may be cryptic and their populations dynamic, the inventories will be carried out over a three-year period, after which time a fairly complete assessment of the breeding avifauna within each park should be possible.

The goal of the bird monitoring is to measure changes in the size of bird populations over time so that assessments of the health of those populations can be made. RMBO has designed a landscape-level bird monitoring program that can allow for the detection of a 3% (or greater) change in population size over a period of no more than 30 years for most common bird species (Leukering et al. 2000).

In the strictest sense, *monitoring* implies that levels of change can be interpreted with high statistical certainty; *tracking* does not imply that high certainty can be inferred. Monitoring can be accomplished through extensive sampling that yields a sufficient number of observations to provide a reasonably precise estimate of density or abundance. Monitoring can also be accomplished through a complete census of a population, where all individuals in that population are recorded.

Although it would be preferable to monitor all bird species within each park, this simply is not possible given the high level of sampling effort or thorough census work that would be needed. For most small parks, monitoring of all species is likely to be either cost-prohibitive due to the amount of effort required, or physically impossible due to the large areas needed for extensive sampling. Under the current plan, monitoring within parks will be possible for the most common species. However, because of an existing cooperative effort between RMBO and Black Hills National Forest (BHNF) to monitor bird populations in the Black Hills, parks in this region will be incorporated into the existing program designed to provide rigorous landscape-level, habitat-specific population trends for most bird species across this region (see Panjabi et al. 2001). Thus, parks in the Black Hills region will gain park-specific information on their avifauna, including trends of the most common species, and so long as BHNF continues its current monitoring effort, they will also be able to examine trends of many more species at the landscape level.

This report details the findings from the first year of what will hopefully become a long-term, cooperative effort to monitor and track bird populations in the national parks in the Northern Great Plains region.

Methods

Inventories and surveys were conducted at each of the seven parks between May 24 and June 17, 2003. Because inventories had already been completed at Wind Cave, only monitoring surveys were conducted at this park. I conducted the field studies at most parks, although other field staff completed the monitoring survey at Jewel Cave, and both the monitoring and inventory components at Devil's Tower. All field personnel were highly skilled in aural and visual bird identification and had completed a five-day training program at the beginning of the season to ensure that data-collection protocols were fully understood and that his/her distance-estimation skills met our requirements (within 10% of true value).

Inventory

Inventories were generally conducted on the first day of the visit, as this allowed the observer to gain familiarity with the park and communicate with park staff regarding access, locations of habitats, etc. With the exception of Devil's Tower (where two observers worked jointly to cover the monitoring and inventory aspects in one night and one day), each park was visited over a two-day period by one observer.

A checklist of documented and expected species provided by the NPS I&M Program (heretofore, the "I&M list") was used to keep a complete list of all bird species seen or heard within a park during the entire visit to that park, both during the specified inventory period and at other times. Inventories were conducted by searching all habitat types found within each park and recording all bird species detected. Effort was made to cover all areas of the parks, with particular emphasis on habitats not being covered under monitoring surveys, although this was not always possible due to the size of the park,

time constraints, or restrictions on public entry to some areas. Because the primary goal of the inventories was to determine the status of expected species that were not yet documented, emphasis was placed on searching habitats where expected species would most likely be found. Effort was made to ensure that restricted habitats such as wetlands, rivers, creeks, and prairie dog towns were covered during the inventories. Although no special effort was made to locate nests, active nests found were documented and, in some cases, their locations recorded using GPS.

Efforts to document nocturnal species were made on one or both nights of the visit through passive listening in targeted habitats, as well as by using tape-recorded vocalizations of targeted species (including all likely owls and nightjars) in these areas. Nocturnal surveys were generally conducted along roadways and trails within three hours after sunset.

Monitoring

Habitat-stratified point-transect surveys were established for population monitoring (Leukering et al. 2000). Because bird species often have strong affinities to certain habitats, stratifying the transects by habitat reduces variation between samples and increases the potential for more powerful analyses. Point-transects were generally conducted on the second day of each visit, after it had been possible to scout out habitats and establish an access point and bearing for the transect. Point-transects consisted of up to 15 point-count locations along a random bearing that transects a stand of a specified habitat.

The habitats in which the point-transects were located were determined based on the dominant habitat types available at each park. Each transect was surveyed by one observer between ½ hour before and 5 hours after sunrise. To maximize efficiency in the mornings, observers located the selected stand on the ground prior to the morning of the survey. Observers used this pre-survey visit to establish an access point for each stand, a random bearing that the transect would follow, and a random distance from the access point (between 0-400 m) at which the first point-count station would be located. On the morning of the survey, the observer began the point-transect at the first count station and then continued along the pre-selected bearing for all remaining points. In many cases, the pre-selected bearing would eventually lead the transect out of the target habitat, or to some obstruction (e.g., cliff or private land), forcing the observer to change the bearing of the transect. When this happened, the observer randomly turned the transect right or left, at an angle perpendicular to the original bearing, and then alternated right or left if additional turns were necessary. In small or linear stands, the size and shape of the stand often pre-determined the location and bearing of the transect.

Observers conducted up to 15 five-minute point-counts at stations located 250 m apart along each transect. All birds detected within the five-minute period were recorded on standardized forms. Fly-overs (birds flying over, but not using the immediate surrounding landscape) were recorded, but excluded from analyses. For each bird observed, we recorded species, sex, how it was detected (e.g., call, song, drumming, etc.),

and radial distance (i.e., from observer to bird). Distances were measured or gauged using laser rangefinders. The transect intervals between count stations were treated as a line transect, and along these intervals individuals of a short list of low-density species (grouse, raptors, woodpeckers, and a few select species from other taxonomic groups) were recorded and the distance and bearing to each measured from the observer on the transect line. Observers also recorded bearings and distances for the same low-density species when they were detected at count stations. Individual birds initially detected on points were not recorded between points.

Observers recorded weather data (i.e., temperature in degrees Fahrenheit, cloud cover, precipitation, and wind--Beaufort scale) and the time at the start and end of each transect. Distances between count stations were measured using hand-held Garmin E-trex™ Global Positioning System units. All GPS data were logged in Universal Transverse Mercator (UTM) North American Datum 1927. At each count station, observers recorded: UTM coordinates, whether or not the station was within 100m of a road, the primary and secondary habitat types in the area, the seral stage and canopy closure of each habitat (Buttery and Gillam 1983), and the primary and secondary understory types (and percent coverage of each) within a 50 m radius around the point. These data were recorded prior to performing each bird count.

Data Analysis

I used program DISTANCE (Thomas et al. 1998-99) to analyze the data collected at point-counts. The notation, concepts, and analysis methods of DISTANCE were developed by Buckland et al. (1993). In DISTANCE analysis, a unique detection function is fit to each distribution of distances associated with a species in a given habitat. Because the detection function is unique to each species in each habitat, DISTANCE analysis avoids some serious problems inherent in traditional analyses of fixed-radius or unlimited-radius point-count data (e.g., unquantifiable differences in detectability among habitats, species, and years). DISTANCE analysis relies on three assumptions, all of which are reasonably well met by *MBBH*: 1) all birds at distance=0 are detected, 2) distances of birds close to the point are measured accurately, and 3) birds do not move in response to the observer's presence.

As a general rule, I only performed DISTANCE analyses on species in each habitat for which there were a minimum of 20 observations (not including fly-overs and outliers), as recorded from count stations on point-transects. However, I performed analyses in a few cases where the number of observations was just shy of this cut-off. In cases where I used small samples to estimate density, some caution should be used in interpreting those results. However, the density estimate produced by DISTANCE analysis is a more robust statistic for monitoring, even when based on a small number of observations, than simply the number of observations per unit effort. In all cases, I made my best effort to present as much information as possible on the greatest number of species for this report.

Results & Discussion

Fort Laramie National Historic Site

Both inventory and monitoring components were completed at Fort Laramie. Good weather provided favorable conditions for both the inventory and monitoring surveys.

Inventory

Sixty-two species were observed at Fort Laramie during June 15-17, 2002 (Appendix A), all of which were likely breeding or summering in the area. Areas searched included the vicinity of the fort, the native grasslands north of the entrance station and hospital, the non-native grasslands east of the fort, the riparian woodland along the North Platte and Laramie rivers, the riparian woodland along the road to the seasonal camping area, and the grassland and ponderosa pine woodlands by the Bedlam trail ruts north of the main park. Most bird species recorded were found in the riparian woodlands along the North Platte and Laramie Rivers. Expected species that were confirmed included Turkey Vulture, Double-crested Cormorant, Wood Duck, Wilson's Snipe (formerly Common Snipe), Ring-necked Pheasant, Rock Dove, Western Wood-Pewee, Red-eyed Vireo, Warbling Vireo, White-breasted Nuthatch, Black-capped Chickadee, Eastern Bluebird, Cedar Waxwing, Common Yellowthroat, Lark Bunting, Lazuli Bunting, Black-headed Grosbeak, Blue Grosbeak, Orchard Oriole and Red Crossbill. Breeding was confirmed for Common Merganser, American Kestrel, Eastern Screech Owl, Red-headed Woodpecker, Cedar Waxwing, and Bullock's Oriole. A Cooper's Hawk was observed near the same location on two different days, suggesting it may have been nesting in the area.

Although the high number of bird species observed is due in part to the range of habitat types present (including the riparian habitats, the rivers, the native grasslands, and the ponderosa pine woodlands), it is primarily due to the nature of the riparian woodlands in the park. The variety of seral stages, wetland, and vegetation types found in the riparian woodland provide the diversity of habitats needed to support a rich avifauna. However, in a few areas understory vegetation is notably absent, and in these areas bird species richness is lower. Ensuring proper regeneration of cottonwoods and willows, in the absence of flooding or other regeneration-promoting disturbance, will be essential to maintaining a diverse and healthy avifauna at Fort Laramie over time.

Monitoring

One point-transect was established in low-elevation riparian woodland along the North Platte and Laramie Rivers, starting by the Old Iron Bridge (adjacent to Hwy. 160) over the North Platte River and ending just southwest of the Fort. Fifteen point-counts were conducted along this transect.

Forty-six species were recorded on point-counts (Table 1). Average density of all bird species combined was estimated at 6.33 birds/ha (Table 2). I was able to estimate density for four species: Mourning Dove, House Wren, Yellow Warbler, and Orchard Oriole. House Wren occurred in greater density than other bird species in this habitat, accounting

for roughly one of every five birds in the riparian woodlands. The results suggest that these four species should be effectively monitored at Fort Laramie through the current point-transect, although negative trends could be difficult to detect for species with small sample sizes.

Table 1. Numbers of bird species recorded on 15 point-counts in riparian woodland at Fort Laramie National Historic Site, Wyoming.

Species	Number Observed	Species	Number Observed
Double-crested Cormorant	1	Barn Swallow	2
Wood Duck	1	Black-capped Chickadee	3
Common Merganser	4	White-breasted Nuthatch	2
American Kestrel	3	Rock Wren	1
Ring-necked Pheasant	2	House Wren	46
Wild Turkey	2	Brown Thrasher	3
Killdeer	1	European Starling	15
Spotted Sandpiper	1	Cedar Waxwing	2
Rock Dove	1	Yellow Warbler	17
Mourning Dove	22	Common Yellowthroat	3
Common Nighthawk	2	Yellow-breasted Chat	4
Belted Kingfisher	1	Spotted Towhee	2
Red-headed Woodpecker	1	Lark Sparrow	4
Downy Woodpecker	4	Song Sparrow	1
Unidentified Woopecker	1	Black-headed Grosbeak	1
Northern Flicker	4	Blue Grosbeak	2
Western Wood-Pewee	8	Red-winged Blackbird	9
Western Kingbird	7	Western Meadowlark	13
Eastern Kingbird	13	Common Grackle	11
Warbling Vireo	3	Brown-headed Cowbird	1
Blue Jay	3	Orchard Oriole	21
Black-billed Magpie	1	Bullock's Oriole	9
American Crow	1	American Goldfinch	5
Cliff Swallow	4	All bird species	262

Table 2. Estimated density of breeding birds in low-elevation riparian woodland at Fort Laramie National Historic Site, Wyoming.

Common Name	Number of Observations	Estimated Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Mourning Dove	22	0.31	0.54	0.18	0.27
House Wren	46	1.34	2.15	0.84	0.24
Yellow Warbler	17	0.22	0.42	0.11	0.33
Orchard Oriole	21	0.59	0.95	0.36	0.24
All bird species	262	6.33	7.54	5.31	0.09

Devil's Tower National Monument

Due to a misunderstanding, the surveys in Devil's Tower were not carried out as planned. When the observers arrived at the park, they learned that there was a request for visitors to voluntarily remain on trails, in part due to Native American religious beliefs around the time of the summer solstice. Therefore, observers chose to limit their survey effort to roads and trail. In 2003, observers will include off-trail areas during surveys and will visit the park at a time that avoids potential conflicts with the summer solstice period.

Inventory

Forty species were observed during June 15-16, 2002 (Appendix B), all of which were likely breeding or summering in the area. All areas accessible by trail or road were searched. However, because the inventory was conducted only from roads and trails, it cannot be considered complete. Breeding was confirmed for American Robin, Barn Swallow, Cliff Swallow, European Starling and Bullock's Oriole. The only previously undocumented species that was observed during the inventory was Northern Saw-whet Owl. However, this and several other species listed as 'expected' on the I&M list are already documented in the park according to the park's own bird checklist (http://www.nps.gov/deto/bird_list.htm).

The number of birds recorded during the inventory was most likely affected by the limitation of the survey to roads and trails. Due to the diversity of habitats found here, including riparian woodlands, native grasslands and ponderosa pine forest, the park probably supports a greater number of breeding bird species than suggested by these results. It is anticipated that in 2003 the surveys will cover the habitats not surveyed in 2002.

Monitoring

Because the observer limited his activity to roads and trails, one point-transect was established in ponderosa pine forest along the Tower Trail, starting by the Tower Trail sign and map (Figure 1). Due to the short length of this trail, only 6 point-counts were conducted along this transect. In 2003, a new survey route will be established that transects this stand at a random bearing.

Twenty-three species were recorded on point-counts, but none were observed in great enough numbers to estimate density (Table 3). Average density of all bird species combined was estimated at 12.17 birds/ha (Table 4), although this estimate includes some birds more closely associated with cliffs (e.g. Rock Dove, White-throated Swift) rather than the ponderosa pine forest. Although the numbers of White-throated Swifts observed was above the threshold of observations needed for such estimates, the uneven distribution of these observations does not allow for a reliable density estimate.

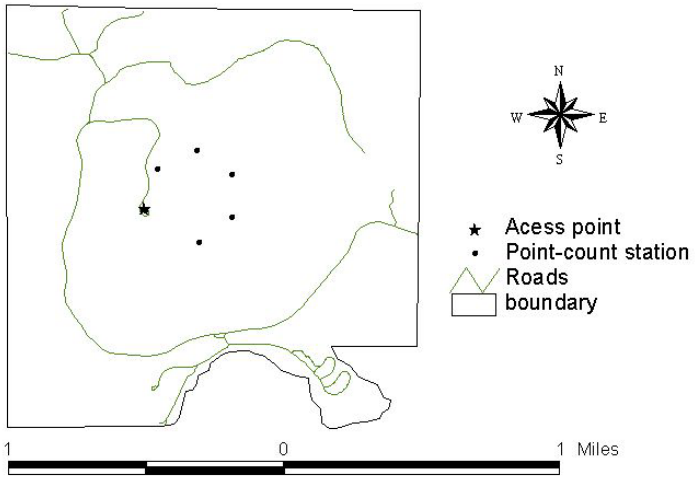

Figure 1. Location of point-transect for bird monitoring in Devil's Tower National Monument, Wyoming.

Table 3. Numbers of breeding bird species recorded on 6 point-counts in ponderosa pine forest at Devil's Tower National Monument, Wyoming.

Species	Number Observed	Species	Number Observed
Turkey Vulture	2	Rock Wren	2
Rock Dove	6	House Wren	1
White-throated Swift	36	Townsend's Solitaire	1
Hairy Woodpecker	1	American Robin	7
Unidentified Woopecker	1	Yellow-rumped Warbler	4
Western Wood-Pewee	7	Western Tanager	4
Plumbeous Vireo	2	Chipping Sparrow	2
Warbling Vireo	5	Dark-eyed Junco	5
Violet-green Swallow	9	Brown-headed Cowbird	2
Black-capped Chickadee	1	Pine Siskin	1
Red-breasted Nuthatch	2	American Goldfinch	1
White-breasted Nuthatch	1	All birds	73
Brown Creeper	2		

Table 4. Estimated density of breeding birds in ponderosa pine forest at Devil's Tower National Monument, Wyoming.

Common Name	Number of Observations	Abundance Index (avg. #birds/count)	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
All bird species	73	12.17	12.694	17.106	9.4201	0.1485

Fort Union Trading Post National Historic Site

Although Fort Union was slated for inventory only, due to a misunderstanding, both inventory and monitoring surveys were conducted. Windy and rainy weather provided less than ideal conditions for surveying birds during my visit to Fort Union. Nonetheless, due to an extensive all-day effort plus two evening searches during the inventory, I feel that most bird species breeding at Fort Union were recorded. However, bird activity, and hence detectability, were probably diminished for some species. Reduced detectability may have affected the results of the point-transect survey.

Inventory

Sixty-nine species were observed during June 10-11, 2002 (Appendix C), all of which were likely breeding or summering in the area. All areas of the park were searched, including the riparian woodland and wetlands along the north side of the Missouri River, the woodlands on the south side of the Missouri River, the non-native grasslands south of the highway, and the grasslands north of the highway along the stakes marking the trail to the overlook. Expected species that were confirmed included Franklin's Gull, Forster's Tern, Wild Turkey, Northern Rough-winged Swallow, Veery, Ovenbird and Black-headed Grosbeak. Black-and-white Warbler, a species that was neither documented nor expected according to the I&M list, was also recorded. Of these species, Wild Turkey, Black-and-white Warbler and Black-headed Grosbeak were already listed as confirmed on Fort Union's own bird checklist.

Habitats at Fort Union include riparian thickets, deciduous woodlands, wetlands, shrublands, and non-native grasslands. The abundance and diversity of birds varies among habitats. The riparian woodlands and wetlands along the Missouri River at Fort Union support a diverse array of birds, especially songbirds and waterbirds. Consequently, most bird species recorded at Fort Union were found in this area. The river itself provides habitat for a few unique bird species not found elsewhere in the park (Western Grebe, Forster's Tern, Spotted Sandpiper), although it is not certain that these birds were actually breeding within the park boundaries. In contrast, the upland non-native grasslands seemed to support few birds other than Western Meadowlarks and an occasional Bobolink, Vesper Sparrow, and Eastern Kingbird. Nonetheless, this area could be important for low-density grassland species that may use this area as part of their home range (e.g. raptors, shrikes, grouse). Restoration of this area to native grasses and shrubs may increase the use of this area by other grassland bird species.

Monitoring

One point-transect was established and surveyed at Fort Union (Figure 2). Due to the small area of the park, it was not possible to keep the entire transect within a single habitat type. The first 10 point-counts fell within low-elevation riparian habitat and the last three counts were in the grassland. Audrey Barnhart, the park resource manager, and a volunteer joined me for the last 3 points on the survey. The transect started on the road by the seasonal housing, headed east along the woodland edge, then south along the eastern park boundary, and then west through the wetlands and woodlands along the Missouri River to the western edge of the park. We resumed the transect on the other

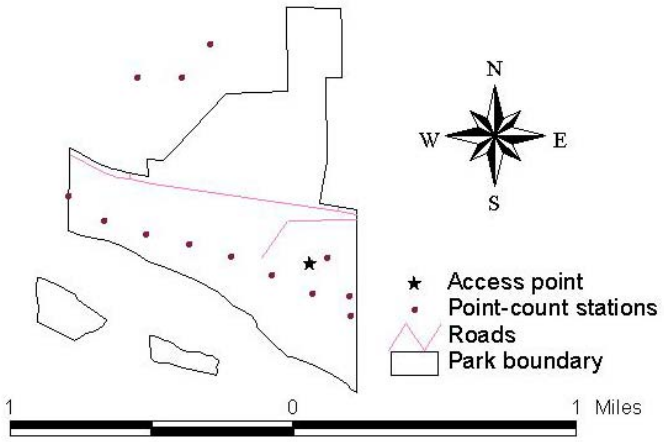

Figure 2. Location of point-transect for bird monitoring at Fort Union Trading Post National Historic Site, North Dakota.

side of the highway, following the stakes through the grasslands to the overlook on the hill. The transect survey was called off after point 13 due to excessive wind and rain.

Forty-six species were recorded on point-counts (Table 5). Unfortunately there were insufficient observations of any single species to derive reasonably reliable density estimates. The low number of observations was probably a result of the low number of counts in each habitat, but may also have been affected by the unfavorable weather. Using data only from within the riparian habitat (i.e. the first 10 points), average density of all bird species combined was estimated at 5.8 birds/ha (Table 6). Yellow Warbler was the most frequently recorded species in this habitat. Unfortunately, based on this year's results, no single species will be effectively monitored using the current point-transect, although the density of all birds combined should be monitored effectively.

If the NPS I&M program wishes to continue the transect monitoring effort at Fort Union, a few changes to the current transect may be warranted. An error occurred when establishing the first few points of the transect resulting in too short of a distance between points two and three. This could be corrected in 2003 with little or no change to the other points. Also, I would suggest either dropping the points in the grassland or making the transect continuous so that there are not gaps between the two legs of the transect. If the grassland points are dropped, additional points could be added across the river in riparian woodland, depending on access and travel time need to get between the two disparate legs of the transect. This may be the best option, as it should result in additional observations of species and perhaps allow for more powerful analyses. Alternatively, the current transect could be left as is and used to track the status of birds species in the park.

Table 5. Numbers of breeding bird species recorded on 13 point-counts in riparian woodland and grasslands at Fort Union Trading Post National Historic Site, Wyoming.

Species	Number Observed	Species	Number Observed
Canada Goose	1	Veery	7
Wood Duck	1	American Robin	1
Gadwall	2	Gray Catbird	3
Mallard	6	Yellow Warbler	15
Blue-winged Teal	9	Black-and-white Warbler	2
Northern Shoveler	1	American Redstart	6
American Kestrel	1	Ovenbird	1
Ring-necked Pheasant	9	Common Yellowthroat	7
Sora	1	Yellow-breasted Chat	5
Franklin's Gull	8	Spotted Towhee	1
Rock Dove	1	Chipping Sparrow	2
Mourning Dove	2	Clay-colored Sparrow	2
Downy Woodpecker	1	Vesper Sparrow	1
Least Flycatcher	1	Lark Sparrow	3
Warbling Vireo	4	Song Sparrow	5
Red-eyed Vireo	4	Black-headed Grosbeak	4
Black-billed Magpie	2	Lazuli Bunting	8
American Crow	2	Red-winged Blackbird	4
Northern Rough-winged Swallow	1	Western Meadowlark	16
Bank Swallow	1	Common Grackle	3
Barn Swallow	2	Brown-headed Cowbird	6
Black-capped Chickadee	2	American Goldfinch	3
House Wren	13	All birds	180

Table 6. Estimated density of breeding birds in riparian woodland at Fort Union Trading Post National Historic Site, North Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
All bird species	142	5.80	7.88	4.27	.15

Jewel Cave National Monument

Both inventory and monitoring components were conducted at Jewel Cave. Weather conditions were favorable during the inventory. Unfortunately, snow in late May forced the early termination of the point-transect survey.

Inventory

Forty-one species were observed during May 24 and July 7-8, 2002 (Appendix D), all of which were likely breeding or summering in the area. Two additional species, Northern Goshawk and Common Poorwill, were observed in the park in May of 2001. These observations were used to document the presence of these species in the park. Areas searched included Lithograph Canyon, the Hell Canyon Trail, the visitor center and surroundings, the burned forest north of Highway 16, and the sewage ponds. Expected species that were confirmed included Northern Goshawk, Northern Saw-whet Owl,

Black-backed Woodpecker, Western Wood-Pewee, Canyon Wren, and Eastern Bluebird. Additional species observed in the park that were not listed as either documented or expected on the I&M list included Mallard, Indigo Bunting, Lark Sparrow, Field Sparrow, Brewer's Blackbird, and American Goldfinch.

Jewel Cave contains a smaller array of habitats than some of the other parks, and thus supports fewer bird species. The predominant habitat in the park is burned ponderosa pine forest (since fall, 2001) interspersed with areas of unburned pine and open meadows. Deciduous vegetation is limited, occurring primarily in a short stretch of Lithograph Canyon. The sewage ponds are the only source of permanent water in the park and appear to provide habitat for Mallards. The patchwork of burned and unburned ponderosa pine forest in the park has created habitat for a suite of species that probably were less common or absent in the park prior to the fire. These include birds such as the Black-backed Woodpecker, Red-headed Woodpecker (not yet observed in the park), Eastern Bluebird and Mountain Bluebird, as well as other open-country birds such as the Indigo Bunting, Vesper Sparrow and Field Sparrow. Although most birds observed in the park were probably breeding in the area, no nests were found.

Monitoring

One point-transect was established in burned ponderosa pine forest, starting near the south entrance to the park on Lithograph Canyon Road (278 Rd) (Figure 3). From here the transect headed northward, eventually crossing Highway 16, and then turned east. Unfortunately, heavy snow on May 24 prevented the observer from completing the entire transect survey, and only 10 of the 15 points were surveyed (the 11th point was established, but not surveyed).

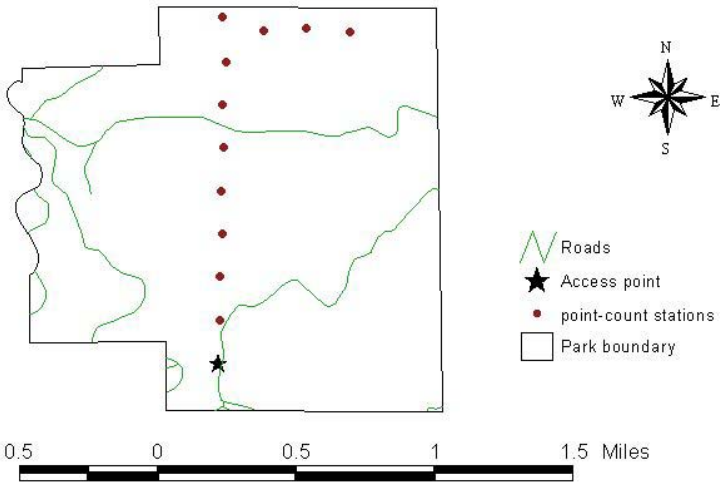

Figure 3. Location of point-transect for bird monitoring in Jewel Cave National Monument, South Dakota.

Sixteen species were recorded on point-counts (Table 7). Average density of all bird species combined was estimated at 10.42 birds/ha (Table 8). Sufficient observations

were obtained to estimate density for one species, Red Crossbill. In future years, when all points are surveyed, it may be possible to estimate density for other species. Red Crossbills occurred in very high density and accounted for roughly 64% of all birds in this habitat. Other common birds in the park included Red-breasted Nuthatch, American Robin and Yellow-rumped Warbler.

Table 7. Numbers of breeding bird species recorded on 10 point-counts in burned ponderosa pine forest at Jewel Cave National Monument, South Dakota.

Species	Number Observed	Species	Number Observed
Hairy Woodpecker	2	American Robin	9
Black-backed Woodpecker	2	Yellow-rumped Warbler	8
Dusky Flycatcher	4	Ovenbird	4
Plumbeous Vireo	2	Chipping Sparrow	3
Black-capped Chickadee	4	Dark-eyed Junco	3
Red-breasted Nuthatch	10	Brown-headed Cowbird	3
White-breasted Nuthatch	4	Red Crossbill	68
Swainson's Thrush	1	All birds	120

Table 8. Estimated density of breeding birds in burned ponderosa pine forest at Jewel Cave National Monument, South Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Red Crossbill	68	6.67	10.52	4.24	0.21
All bird species	120	10.43	13.34	8.15	0.12

Knife River Indian Villages National Historic Site

Both inventory and monitoring surveys were conducted at Knife River. Two point-transects were established and surveyed. Weather conditions were favorable and all work was completed as planned.

Inventory

Seventy-three species were observed during June 12-15, 2002 (Appendix E), all of which were likely breeding or summering in the area. Areas searched included the North Woods, the grasslands north of the Big Hidatsa Village Road, the grasslands north, south and east of the visitor center, the riparian woodlands along both sides of the Knife River, the riparian woodlands around the confluence of the Knife and Missouri rivers, and the riparian woodlands north of the Stanley town campground. Expected species that were confirmed were Chimney Swift and Savannah Sparrow. Additional species observed in the park that were not listed as either documented or expected on the I&M list include Broad-winged Hawk, Forster's Tern, Marbled Godwit, Willet and Common Grackle. Breeding was confirmed for Cliff Swallow, Western Kingbird, Cedar Waxwing, Yellow Warbler and Baltimore Oriole. The observation of Broad-winged Hawk is of interest as

this species is reportedly rare in this region (Stewart, 1975). Although breeding was not confirmed, the observation of a pair is suggestive that they may have nested in the area.

The high number of bird species observed in the park is due largely to the great extent and excellent condition of the diverse habitats found here, including the riparian woodlands, the rivers and sandbars, the native grasslands and the hayfields. By far, the greatest number of bird species was found in the "North Woods" area. This area consists of an exceptionally dense, mature riparian forest, with an abundance of dead and downed wood, and adjacent clearings, shrublands and wetlands. An area with similar diversity and abundance of birds as the North Woods is located at the south end of the park, just north of the Stanley town park campground. However, this area is much smaller than the North Woods, and it consequently supports fewer birds.

The diversity and abundance of birds in the North Woods contrast markedly with those in the woodlands that appear to have been treated with fire and/or thinning. Many of the riparian forest birds found in the North Woods, such as Cooper's Hawk, Eastern Screech Owl, Black-billed Cuckoo, Black-and-white Warbler, Ovenbird and American Redstart, were not found in these open woodlands. The prevalence of many other forest birds, such as Least Flycatcher, Red-eyed Vireo and Yellow Warbler, was also noticeably lower in these burned woodlands. In contrast, birds that were more abundant in these burned woodlands included Western Kingbird and Lark Sparrow. I strongly recommend not treating the North Woods in any way that would reduce the density of live and dead vegetation in this area, as doing so could greatly diminish the rich bird life presently found there.

Monitoring

Two point-transects were established at Knife River, one in dense riparian forest and the other in grassland (Figure 4). The grassland transect started at the junction of Highway 200 and the Big Hidatsa Village road and headed northeast through the grassland. The first part of this route transected non-native *Bromus* sp. grassland before entering into native mixed-grass prairie, eventually terminating near the northern border of the park. While it would have been preferable to keep the entire transect within one type of grassland, neither type was extensive enough to support a 15-point transect.

Thirty-three species were recorded on point-counts in the grassland habitat, although some of these were using adjacent forest/shrubland habitats (Table 9). Average density of all bird species combined was estimated at 4.12 birds/ha along this transect. I was able to estimate density for three individual species: Bobolink, Grasshopper Sparrow, and Western Meadowlark (Table 10). Densities of two grassland species, Bobolink and Grasshopper Sparrow, were surprisingly high at Knife River. Both species occurred in densities greater than one bird per hectare. Bobolink occurred in greater density than other bird species in this habitat, accounting for roughly 37% of all birds in this habitat, whereas Grasshopper Sparrow accounted for roughly 28% of all birds. The results

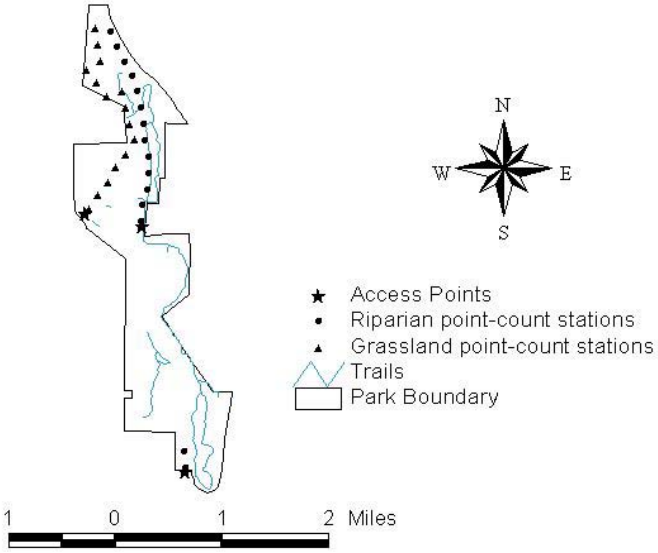

Figure 4. Locations of point-transects for bird monitoring in Knife River Indian Villages National Historic Site, North Dakota.

suggest that these three species should be effectively monitored at Knife River through the current point-transect in grassland, although negative trends could be difficult to detect for species with low sample sizes.

Table 9. Numbers of breeding bird species recorded on 15 point-counts in grasslands at Knife River Indian Villages National Historic Site, North Dakota.

Species	Number Observed	Species	Number Observed
Northern Pintail	2	Brown Thrasher	1
Northern Harrier	1	European Starling	1
Red-tailed Hawk	1	Yellow Warbler	4
Ring-necked Pheasant	13	Common Yellowthroat	5
Willet	1	Yellow-breasted Chat	1
Upland Sandpiper	8	Spotted Towhee	5
Mourning Dove	7	Clay-colored Sparrow	10
Great Horned Owl	1	Field Sparrow	8
Common Nighthawk	2	Lark Sparrow	1
Northern Flicker	6	Grasshopper Sparrow	35
Least Flycatcher	3	Song Sparrow	1
Eastern Kingbird	8	Bobolink	72
Black-billed Magpie	1	Red-winged Blackbird	3
American Crow	1	Western Meadowlark	19
Bank Swallow	2	Brewer's Blackbird	3
House Wren	5	American Goldfinch	5
Gray Catbird	2	All birds	234

Table 10. Estimated density of breeding birds in grasslands at Knife River Indian Villages National Historic Site, North Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Grasshopper Sparrow	35	1.16	1.84	0.73	0.23
Bobolink	72	1.53	2.40	0.97	0.22
Western Meadowlark	19	0.10	0.16	0.06	0.24
All bird species	234	4.12	4.90	3.46	0.09

I located the riparian forest transect wholly within the dense riparian forest type, rather than in the open forest type or in both, as the dense riparian forest proved to be the most valuable from an ornithological standpoint, and locating the transect wholly within a single type would reduce variation between samples. However, in order to achieve 15 counts in this habitat, I split the transect into two sections (Figure 4). The first 2 counts were located in the southern end of the park, starting at the park boundary just north of the Stanley town park campground (the first count was conducted at the access point). After completing these two counts in this section I then drove to the parking area just south of the North Woods, established a second access point, and continued northward on foot from here to complete the transect.

Forty-six species were recorded on point-counts in the riparian forest habitat (Table 11). Average density of all bird species combined was estimated at 44.52 birds/ha, considerably higher than in any other area surveyed, and exceedingly high by any standards (Table 12). I was able to estimate density for six individual species in this habitat: Least Flycatcher, Red-eyed Vireo, House Wren, Yellow Warbler, American Redstart and Ovenbird. Density of American Redstart was estimated to be 5.26 birds/ha, higher than that of any other bird species in this habitat. The results suggest that these six species should be effectively monitored at Knife River through the current point-transect in riparian forest.

The extraordinarily high density and richness of bird species, along with the presence of several rare or uncommon species, underscore the value of this riparian forest toward avian diversity at Knife River.

Table 11. Numbers of breeding bird species recorded on 15 point-counts in riparian forest at Knife River Indian Villages National Historic Site, North Dakota.

Species	Number Observed	Species	Number Observed
Great Blue Heron	1	American Robin	13
Broad-winged Hawk	2	Gray Catbird	3
Red-tailed Hawk	2	Cedar Waxwing	13
Ring-necked Pheasant	9	Yellow Warbler	31
Wild Turkey	1	Black-and-white Warbler	10
California Gull	1	American Redstart	32
Mourning Dove	6	Ovenbird	20
Black-billed Cuckoo	1	Common Yellowthroat	12
Great Horned Owl	2	Yellow-breasted Chat	6
Chimney Swift	2	Spotted Towhee	13

Species	Number Observed	Species	Number Observed
Hairy Woodpecker	5	Clay-colored Sparrow	7
Unidentified Woopecker	1	Field Sparrow	5
Northern Flicker	2	Lark Sparrow	1
Least Flycatcher	20	Song Sparrow	11
Great Crested Flycatcher	4	Black-headed Grosbeak	7
Eastern Kingbird	2	Lazuli Bunting	1
Red-eyed Vireo	35	Bobolink	1
Blue Jay	1	Western Meadowlark	5
American Crow	5	Brewer's Blackbird	1
Northern Rough-winged Swallow	1	Common Grackle	3
Bank Swallow	6	Brown-headed Cowbird	13
Black-capped Chickadee	6	American Goldfinch	8
White-breasted Nuthatch	3	All birds	347
House Wren	29		

Table 12. Estimated density of breeding birds in riparian forest at Knife River Indian Villages National Historic Site, North Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Least Flycatcher	20	4.45	10.36	1.91	0.43
Red-eyed Vireo	35	2.08	3.17	1.37	0.21
House Wren	29	2.25	4.74	1.06	0.38
Yellow Warbler	31	3.04	6.10	1.51	0.36
American Redstart	32	5.26	9.58	2.89	0.30
Ovenbird	20	1.00	1.84	0.54	0.31
All birds	347	44.52	68.62	28.88	0.22

Mount Rushmore National Memorial

Both inventory and monitoring surveys were carried out at Mount Rushmore. Sunny weather provided generally good conditions during both surveys, although strong afternoon winds compromised inventory efforts a slight degree.

Inventory

Thirty-five species were observed during June 5-6, 2002 (Appendix F), all of which were likely breeding or summering in the area. Areas searched included Starling Basin west and south from highway 244 to the park boundary, the rock spires around Mount Rushmore, the visitor parking area, the area along the road to the staff housing, and a small portion of the area south of highway 244 across from the parking area. Expected species that were confirmed were Sharp-shinned Hawk, Northern Saw-whet Owl, Common Nighthawk, Rock Dove and Dusky Flycatcher. Additional species observed in the park that were not listed as either documented or expected on the I&M list were Rock Wren, Common Yellowthroat and Black-headed Grosbeak. Breeding was confirmed for Wild Turkey, Hairy Woodpecker, and Violet-green Swallow.

The habitat at Mount Rushmore consists primarily of ponderosa pine forest, although a number of vegetative, hydrologic and geologic features contribute to a more diverse landscape. The pine forest is comprised of a range of age classes, but is mostly mature or old-growth. In a few places, small stands of aspen provide habitat for species such as Dusky Flycatcher, Warbling Vireo and Black-headed Grosbeak. A wetland in the bottom of Starling Basin supported a Common Yellowthroat. A few white spruce trees, also along the bottom of Starling Basin, provide habitat for Swainson's Thrush and Ruby-crowned Kinglet. The tall rock spires around Mount Rushmore provide habitat for cliff nesting species, such as Rock Dove, White-throated Swift, Canyon Wren and Violet-green Swallow. The clearings around the staff housing units appear suitable for some open-country birds, but no additional species were recorded there. However, this area was visited in the afternoon when bird activity was reduced.

Monitoring

One point-transect was established in ponderosa pine forest at Mount Rushmore, starting at the entrance sign on the west side of the park along Highway 244 (Figure 5). From here the transect headed southeast, jogged to the southwest for one point, and then continued southeast through Starling Basin until it intersected the Centennial Spur Trail, where it turned to the northeast and continued to the Burn Pit, where it then turned to the northwest and crossed the highway before terminating. Dan Licht, the Northern Great Plains I&M coordinator, accompanied me on this transect survey.

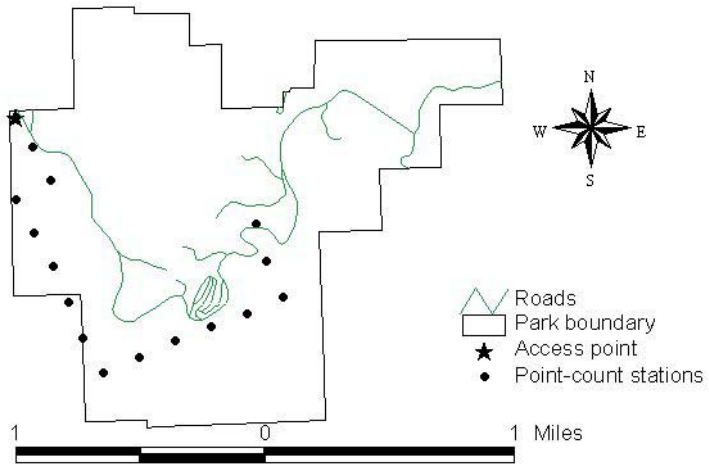

Figure 5. Location of point-transect for bird monitoring in Mount Rushmore National Memorial, South Dakota.

Twenty-six species were recorded on point-counts along this transect in ponderosa pine habitat (Table 13). Average density of all bird species combined was estimated at 3.21 birds/ha in this habitat (Table 14). I was able to estimate density for one individual species: Yellow-rumped Warbler. Yellow-rumped Warbler was the most commonly recorded species on point-counts, followed by Red-breasted Nuthatch. The results suggest that Yellow-rumped Warbler should be effectively monitored via the current point-transect.

Table 13. Numbers of breeding bird species recorded on 15 point-counts in ponderosa pine forest at Mount Rushmore National Memorial, South Dakota.

Species	Number Observed	Species	Number Observed
Wild Turkey	1	Ruby-crowned Kinglet	2
White-throated Swift	3	Townsend's Solitaire	4
Hairy Woodpecker	3	Swainson's Thrush	1
Unidentified Woopecker	1	American Robin	9
Northern Flicker	1	Yellow-rumped Warbler	26
Cordilleran Flycatcher	2	Ovenbird	9
Warbling Vireo	9	Common Yellowthroat	1
Violet-green Swallow	1	Western Tanager	3
Black-capped Chickadee	5	Chipping Sparrow	8
Red-breasted Nuthatch	13	Dark-eyed Junco	8
White-breasted Nuthatch	1	Black-headed Grosbeak	1
Brown Creeper	1	Red Crossbill	6
Rock Wren	1	Pine Siskin	7
Canyon Wren	1	All bird species	124

Table 14. Estimated density of breeding birds in ponderosa pine forest at Mount Rushmore National Memorial, South Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Yellow-rumped Warbler	26	0.58	1.01	0.34	0.27
All bird species	124	3.21	4.34	2.38	0.15

Wind Cave National Park

Two point-transects were conducted at Wind Cave for bird monitoring. Although no specific effort was devoted toward inventorying bird species in the park, a few uncommon or unusual birds were observed that are worth noting.

- A Clay-colored Sparrow, a transient migrant, was observed singing in the mixed-grass prairie to the east of NPS 6 Rd in late May.
- On June 3rd, an Alder Flycatcher, also a transient migrant, was observed calling from a lone willow bush 50 m from Spring Creek. Although this species is not reported to occur in western South Dakota during spring passage (Tallman et al. 2002), another individual of this species was observed by another crewmember, Michael Freiberg, on June 8th along Whitewood Creek near Englewood, further

north and west in the Black Hills. Both of these birds were identified by their emphatic "*free*-beer" call, which is diagnostic for the species.

- An Eastern Phoebe was observed calling from a steep cliff adjacent to Spring Creek.
- Two or more pairs of Cliff Swallows were nesting on this same cliff along Spring Creek.
- Additional species of interest that were observed in the park, but were not common, included Sharp-tailed Grouse, Red-headed Woodpecker, Red-eyed Vireo, Canyon Wren, Gray Catbird, American Redstart and Orchard Oriole.
- Upland Sandpiper and Western Wood-Pewee, two species that are rare or uncommon in much of the Black Hills, were surprisingly common in parts of Wind Cave.

Monitoring

Two point-transects were established at Wind Cave, one in mixed-prairie grassland and one in foothill riparian habitat (Figure 6).

The transect in foothill riparian habitat started at the west entrance to the park on Highway 385 and followed Spring Creek downstream to its confluence with Beaver Creek, and then continued downstream along Beaver Creek. Although this transect followed the creek closely, not all counts were conducted in similar vegetation types. The vegetation along the creek varied from dense riparian brush, to light woodland, to open wet meadows and grasslands. Stands of live and burned ponderosa pine were

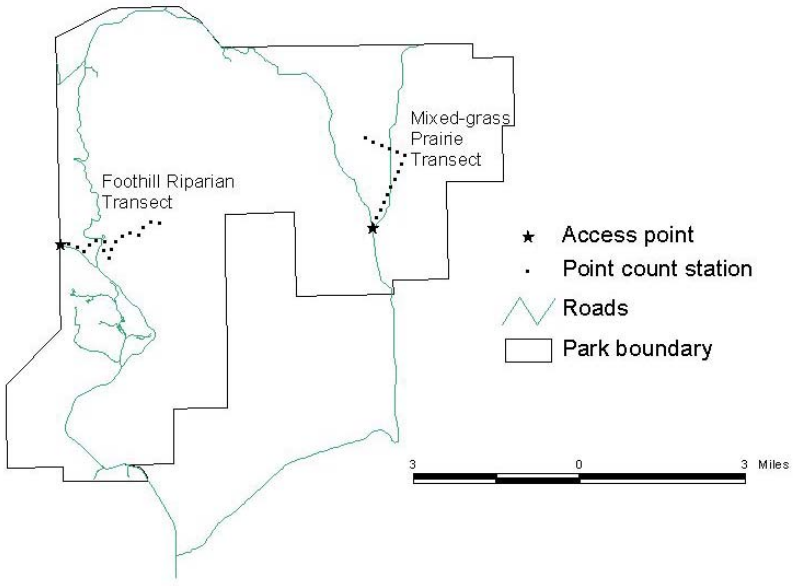

Figure 6. Locations of point-transects for bird monitoring in Wind Cave National Park, South Dakota.

present on hillsides adjacent to much of the creek. In some places, the creek ran through canyons with steep cliffs. Two additional point-count stations were added to this transect

to compensate for the low number of riparian woodland birds recorded at two points in open areas. Thus a total of 17 counts were conducted along this transect.

Forty-seven bird species were observed along this transect (Table 15). Average density of all birds combined was estimated at 7.83 birds/ha (Table 16). The abundance and richness of bird species on the foothill riparian transect was high due to the diversity and good condition of habitats along Spring and Beaver Creeks, including the dense riparian thickets, deciduous woodlands, ponderosa pine forests, burned stands of pine, grasslands, wet meadows, and cliffs. I obtained sufficient observations to estimate density for five individual species: Western Wood-Pewee, Violet-green Swallow, House Wren, Yellow Warbler, and Common Yellowthroat. Common Yellowthroat was the most densely populated species along this transect, with an estimated 2.58 birds per hectare. These species should be monitored via the current point-transect, although negative trends could be difficult to detect due to small sample sizes in some cases. Additional point-transects within the park in similar riparian habitat should increase the number of observations of these species, and increase our ability to detect trends for these and other species.

Table 15. Numbers of breeding bird species recorded in foothill riparian woodland at Wind Cave National Park, South Dakota.

Species	Number Observed	Species	Number Observed
Mallard	3	American Robin	11
Upland Sandpiper	1	Gray Catbird	1
Mourning Dove	3	Cedar Waxwing	18
White-throated Swift	1	Yellow Warbler	21
Red-headed Woodpecker	1	Yellow-rumped Warbler	1
Hairy Woodpecker	1	American Redstart	3
Unidentified Woopecker	1	Ovenbird	3
Northern Flicker	3	Common Yellowthroat	28
Western Wood-Pewee	18	Yellow-breasted Chat	5
Alder Flycatcher	1	Western Tanager	4
Dusky Flycatcher	4	Spotted Towhee	10
Cordilleran Flycatcher	3	Lark Sparrow	1
Eastern Phoebe	1	Song Sparrow	2
Plumbeous Vireo	3	Dark-eyed Junco	1
Warbling Vireo	7	Black-headed Grosbeak	14
Red-eyed Vireo	2	Red-winged Blackbird	1
American Crow	2	Western Meadowlark	14
Violet-green Swallow	27	Brewer's Blackbird	11
Cliff Swallow	4	Common Grackle	6
Barn Swallow	3	Brown-headed Cowbird	6
Black-capped Chickadee	2	Red Crossbill	14
Red-breasted Nuthatch	2	Pine Siskin	1
White-breasted Nuthatch	1	American Goldfinch	1
Canyon Wren	2	All birds	273
House Wren	18		

Table 16. Estimated density of breeding bird species recorded in foothill riparian habitat at Wind Cave National Park, South Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Western Wood-Pewee	18	0.15	0.26	0.08	0.28
Violet-green Swallow	27	0.40	1.47	0.11	0.69
House Wren	18	0.30	0.60	0.15	0.35
Yellow Warbler	21	0.82	1.58	0.42	0.33
Common Yellowthroat	28	2.58	5.53	1.21	0.39
All birds	273	7.83	10.50	5.83	0.15

The transect in mixed-prairie grassland began at the intersection of NPS 5 and NPS 6 roads, in the northern end of the park, and headed northeast for the first ten counts, and then turned to the northwest for the last 5 counts. Although this transect primarily sampled mixed-prairie grassland, it crossed a sparse riparian woodland at two points, and therefore a few riparian species were found along this route.

Nineteen species were recorded in the mixed-grass prairie habitat in Wind Cave (Table 17), although four of these, European Starling, Common Yellowthroat, Red-winged Blackbird and Orchard Oriole were limited primarily to sparse riparian vegetation along the bottom of a valley. Density of all birds combined along this transect was estimated at 1.21 birds/ha (Table 18). I was able to estimate density for two of the most common bird species along this transect, Upland Sandpiper and Western Meadowlark. Western Meadowlark was the most densely populated species in this habitat, with an estimated .45 birds per hectare. These species should be effectively monitored via the current point-transect, although negative trends for Upland Sandpiper could be difficult to detect due to the low number of observations. Additional point-transects in mixed-grass prairie habitat would increase the number of observations of this and other species and increase our ability to detect trends.

Although the density and richness of bird species is relatively low in the mixed-grass prairie, this habitat supports a unique suite of birds, including Upland Sandpiper, Sharp-tailed Grouse and Grasshopper Sparrow, in addition to others that may occur here but were not detected on this single survey. The number of Upland Sandpipers in this part of Wind Cave far exceeds the number of this species I have encountered anywhere else in the Black Hills. While I have observed Upland Sandpipers in Custer State Park, I have not observed them in any of the grasslands on the Black Hills National Forest. And although only two Sharp-tailed Grouse were observed on this transect, this species also appears to be more abundant here than in other parts of the Black Hills.

Table 17. Numbers of breeding bird species recorded in mixed-prairie grassland at Wind Cave National Park, South Dakota.

Species	Number Observed	Species	Number Observed
Sharp-tailed Grouse	2	Common Yellowthroat	1
Killdeer	3	Spotted Towhee	2
Upland Sandpiper	19	Clay-colored Sparrow	1
Mourning Dove	4	Vesper Sparrow	4
Eastern Kingbird	3	Grasshopper Sparrow	6

Species	Number Observed	Species	Number Observed
American Crow	2	Red-winged Blackbird	10
Northern Rough-winged Swallow	2	Western Meadowlark	78
Barn Swallow	3	Orchard Oriole	1
Rock Wren	2	American Goldfinch	4
European Starling	2	All birds	246

Table 18. Relative abundance and estimate density of breeding bird species recorded in mixed-prairie grassland at Wind Cave National Park, South Dakota.

Common Name	Number of Observations	Density (avg. #birds/ha.)	Upper 95% Confidence Limit	Lower 95% Confidence Limit	Coefficient of Variation
Upland Sandpiper	19	0.18	0.41	0.08	0.43
Western Meadowlark	78	0.45	0.60	0.35	0.14
All birds	246	1.21	1.64	0.89	0.16

Acknowledgements

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Appendix A. Bird species observed at Fort Laramie National Historic Site, 2002.

Species	Scientific Name
Double-crested Cormorant	*Phalacrocorax auritus*
Great Blue Heron	*Ardea herodias*
Turkey Vulture	*Cathartes aura*
Wood Duck	*Aix sponsa*
Mallard	*Anas platyrhynchos*
Common Merganser	*Mergus merganser*
Cooper's Hawk	*Accipiter cooperii*
American Kestrel	*Falco sparverius*
Ring-necked Pheasant	*Phasianus colchicus*
Wild Turkey	*Meleagris gallopavo*
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
Wilson's Snipe	*Gallinago wilsonia*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Eastern Screech-Owl	*Otus asio*
Common Nighthawk	*Chordeiles minor*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Western Wood-Pewee	*Contopus sordidulus*
Say's Phoebe	*Sayornis saya*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*
Loggerhead Shrike	*Lanius ludovicianus*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue Jay	*Cyanocitta cristata*
Black-billed Magpie	*Pica hudsonia*
American Crow	*Corvus brachyrhynchos*
Violet-green Swallow	*Tachycineta thalassina*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*
Black-capped Chickadee	*Poecile atricapilla*
White-breasted Nuthatch	*Sitta carolinensis*
Rock Wren	*Salpinctes obsoletus*
House Wren	*Troglodytes aedon*
Eastern Bluebird	*Sialia sialis*
American Robin	*Turdus migratorius*
Brown Thrasher	*Toxostoma rufum*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bombycilla cedrorum*

Yellow Warbler	*Dendroica petechia*
Common Yellowthroat	*Geothlypis trichas*
Yellow-breasted Chat	*Icteria virens*
Spotted Towhee	*Pipilo maculatus*
Chipping Sparrow	*Spizella passerina*
Lark Sparrow	*Chondestes grammacus*
Lark Bunting	*Calamospiza melanocorys*
Song Sparrow	*Melospiza melodia*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Blue Grosbeak	*Passerina caerulea*
Lazuli Bunting	*Passerina amoena*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Orchard Oriole	*Icterus spurius*
Bullock's Oriole	*Icterus bullockii*
Red Crossbill	*Loxia curvirostra*
American Goldfinch	*Carduelis tristis*

Appendix B. Bird species observed at Devil's Tower National Monument, 2002.

Species	Scientific Name
Turkey Vulture	*Cathartes aura*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Northern Saw-whet Owl	*Aegolius acadicus*
Common Nighthawk	*Chordeiles minor*
White-throated Swift	*Aeronautes saxatalis*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Western Wood-Pewee	*Contopus sordidulus*
Western Kingbird	*Tyrannus verticalis*
Plumbeous Vireo	*Vireo plumbeous*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Cliff Swallow	*Petrochelidon pyrrhonota*
Black-capped Chickadee	*Poecile atricapilla*
Red-breasted Nuthatch	*Sitta canadensis*
Brown Creeper	*Certhia americana*
Rock Wren	*Salpinctes obsoletus*
House Wren	*Troglodytes aedon*
Townsend's Solitaire	*Myadestes townsendi*
American Robin	*Turdus migratorius*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bombycilla cedrorum*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
Spotted Towhee	*Pipilo maculatus*
Chipping Sparrow	*Spizella passerina*
Lark Sparrow	*Chondestes grammacus*
Dark-eyed Junco	*Junco hyemalis*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*
Pine Siskin	*Carduelis pinus*
American Goldfinch	*Carduelis tristis*

Appendix C. Bird species observed at Fort Union Trading Post National Historic Site, 2002.

Species	Scientific Name
Western Grebe	*Aechmophorus occidentalis*
American White Pelican	*Pelecanus erythrorhynchos*
Double-crested Cormorant	*Phalacrocorax auritus*
Turkey Vulture	*Cathartes aura*
Canada Goose	*Branta canadensis*
Wood Duck	*Aix sponsa*
Gadwall	*Anas strepera*
Mallard	*Anas platyrhynchos*
Blue-winged Teal	*Anas discors*
Northern Shoveler	*Anas clypeata*
Northern Harrier	*Circus cyaneus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Prairie Falcon	*Falco mexicanus*
Ring-necked Pheasant	*Phasianus colchicus*
Wild Turkey	*Meleagris gallopavo*
Sora	*Porzana carolina*
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
Franklin's Gull	*Larus pipixcan*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Forster's Tern	*Sterna forsteri*
Rock Dove	*Columba livia*
Band-tailed Pigeon	*Columba fasciata*
Mourning Dove	*Zenaida macroura*
Great Horned Owl	*Bubo virginianus*
Common Nighthawk	*Chordeiles minor*
Downy Woodpecker	*Picoides pubescens*
Northern Flicker	*Colaptes auratus*
Least Flycatcher	*Empidonax minimus*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Black-billed Magpie	*Pica hudsonia*
American Crow	*Corvus brachyrhynchos*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Petrochelidon pyrrhonota*
Barn Swallow	*Hirundo rustica*
Black-capped Chickadee	*Poecile atricapilla*
House Wren	*Troglodytes aedon*

Veery	*Catharus fuscescens*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
European Starling	*Sturnus vulgaris*
Yellow Warbler	*Dendroica petechia*
Black-and-white Warbler	*Mniotilta varia*
American Redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Common Yellowthroat	*Geothlypis trichas*
Yellow-breasted Chat	*Icteria virens*
Spotted Towhee	*Pipilo maculatus*
Chipping Sparrow	*Spizella passerina*
Clay-colored Sparrow	*Spizella pallida*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Song Sparrow	*Melospiza melodia*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*
Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*
American Goldfinch	*Carduelis tristis*

Appendix D. Bird species observed at Jewel Cave National Monument, 2002.

Species	Scientific Name
Turkey Vulture	*Cathartes aura*
Northern Goshawk	*Accipiter gentilis*
Mourning Dove	*Zenaida macroura*
Northern Saw-whet Owl	*Aegolius acadicus*
Common Nighthawk	*Chordeiles minor*
Common Poorwill	*Phalaenoptilus nuttallii*
White-throated Swift	*Aeronautes saxatalis*
Hairy Woodpecker	*Picoides villosus*
Black-backed Woodpecker	*Picoides arcticus*
Northern Flicker	*Colaptes auratus*
Western Wood-Pewee	*Contopus sordidulus*
Dusky Flycatcher	*Empidonax oberholseri*
Plumbeous Vireo	*Vireo plumbeous*
Warbling Vireo	*Vireo gilvus*
American Crow	*Corvus brachyrhynchos*
Violet-green Swallow	*Tachycineta thalassina*
Black-capped Chickadee	*Poecile atricapilla*
Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*
Brown Creeper	*Certhia americana*
Canyon Wren	*Catherpes mexicanus*
House Wren	*Troglodytes aedon*
Eastern Bluebird	*Sialia sialis*
Mountain Bluebird	*Sialia currucoides*
Townsend's Solitaire	*Myadestes townsendi*
Swainson's Thrush	*Catharus ustulatus*
American Robin	*Turdus migratorius*
Yellow-rumped Warbler	*Dendroica coronata*
Ovenbird	*Seiurus aurocapillus*
MacGillivray's Warbler	*Oporornis tolmiei*
Western Tanager	*Piranga ludoviciana*
Chipping Sparrow	*Spizella passerina*
Field Sparrow	*Spizella pusilla*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Dark-eyed Junco	*Junco hyemalis*
Indigo Bunting	*Passerina cyanea*
Brewer's Blackbird	*Euphagus cyanocephalus*
Brown-headed Cowbird	*Molothrus ater*
Red Crossbill	*Loxia curvirostra*
Pine Siskin	*Carduelis pinus*
American Goldfinch	*Carduelis tristis*

Appendix E. Bird species observed at Knife River Indian Villages National Historic Site, 2002.

Species	Scientific Name
American White Pelican	*Pelecanus erythrorhynchos*
Great Blue Heron	*Ardea herodias*
Turkey Vulture	*Cathartes aura*
Canada Goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Bald Eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Cooper's Hawk	*Accipiter cooperii*
Broad-winged Hawk	*Buteo platypterus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Ring-necked Pheasant	*Phasianus colchicus*
Wild Turkey	*Meleagris gallopavo*
Killdeer	*Charadrius vociferus*
Willet	*Catoptrophorus semipalmatus*
Upland Sandpiper	*Bartramia longicauda*
Marbled Godwit	*Limosa fedoa*
California Gull	*Larus californicus*
Forster's Tern	*Sterna forsteri*
Band-tailed Pigeon	*Columba fasciata*
Mourning Dove	*Zenaida macroura*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Eastern Screech-Owl	*Otus asio*
Great Horned Owl	*Bubo virginianus*
Common Nighthawk	*Chordeiles minor*
Chimney Swift	*Chaetura pelagica*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Least Flycatcher	*Empidonax minimus*
Great Crested Flycatcher	*Myiarchus crinitus*
Western Kingbird	*Tyrannus verticalis*
Eastern Kingbird	*Tyrannus tyrannus*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue Jay	*Cyanocitta cristata*
Black-billed Magpie	*Pica hudsonia*
American Crow	*Corvus brachyrhynchos*
Tree Swallow	*Tachycineta bicolor*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Petrochelidon pyrrhonota*
Black-capped Chickadee	*Poecile atricapilla*
White-breasted Nuthatch	*Sitta carolinensis*

House Wren	*Troglodytes aedon*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Brown Thrasher	*Toxostoma rufum*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bombycilla cedrorum*
Yellow Warbler	*Dendroica petechia*
Black-and-white Warbler	*Mniotilta varia*
American Redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Common Yellowthroat	*Geothlypis trichas*
Yellow-breasted Chat	*Icteria virens*
Spotted Towhee	*Pipilo maculatus*
Clay-colored Sparrow	*Spizella pallida*
Field Sparrow	*Spizella pusilla*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow	*Ammodramus savannarum*
Song Sparrow	*Melospiza melodia*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*
Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Western Meadowlark	*Sturnella neglecta*
Brewer's Blackbird	*Euphagus cyanocephalus*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Orchard Oriole	*Icterus spurius*
Baltimore Oriole	*Icterus galbula*
American Goldfinch	*Carduelis tristis*

Appendix F. Bird species observed at Mount Rushmore National Memorial, 2002.

Species	**Scientific Name**
Turkey Vulture	*Cathartes aura*
Sharp-shinned Hawk	*Accipiter striatus*
Wild Turkey	*Meleagris gallopavo*
Rock Dove	*Columba livia*
Northern Saw-whet Owl	*Aegolius acadicus*
Common Nighthawk	*Chordeiles minor*
White-throated Swift	*Aeronautes saxatalis*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Dusky Flycatcher	*Empidonax oberholseri*
Cordilleran Flycatcher	*Empidonax occidentalis*
Warbling Vireo	*Vireo gilvus*
American Crow	*Corvus brachyrhynchos*
Violet-green Swallow	*Tachycineta thalassina*
Black-capped Chickadee	*Poecile atricapilla*
Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*
Brown Creeper	*Certhia americana*
Rock Wren	*Salpinctes obsoletus*
Ruby-crowned Kinglet	*Regulus calendula*
Townsend's Solitaire	*Myadestes townsendi*
Swainson's Thrush	*Catharus ustulatus*
American Robin	*Turdus migratorius*
Yellow-rumped Warbler	*Dendroica coronata*
Ovenbird	*Seiurus aurocapillus*
Common Yellowthroat	*Geothlypis trichas*
Western Tanager	*Piranga ludoviciana*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Brown-headed Cowbird	*Molothrus ater*
Red Crossbill	*Loxia curvirostra*
Pine Siskin	*Carduelis pinus*